

Claim 3, line 1, change "1" to --13--.

Claim 9, line 1, change "4" to --15--.

REMARKS

Upon entry of the above amendment, the claims will be 3, 9, 10 and 13-20.

The above amendment is responsive to points set forth in the Official Action.

In this regard, a new set of claims is presented as follows:

Claim 13 has been formed by combining original claims 1, 2 and 5.

Claim 14 is a new claim dependent upon claim 13, and fairly based on page 10, line 32 to page 13, line 21 and Examples 2 and 3 of the Specification.

Claim 15 is formed by combining the features of original claims 6 and 7.

Claim 16 corresponds to original claim 11, re-written to avoid the Examiner's insufficiency rejections.

Claim 17 is based on page 4, line 36 to page 5 line 8 and page 16, lines 21 to 27 of the specification as filed.

Claim 18 corresponds to original claim 12, re-written to meet the Examiner's insufficiency rejection.

Claims 19 and 20 are new claims to magnetically attractable beads based, as is claim 17, on the disclosure on page 4, line 36 to page 5, line 8 and page 16, lines 21 to 28 of the Specification.

Claim 3 is made dependent on new claim 13.

Claim 9 is made dependent on new claim 15.

All method claims in the case are now directed to the use of magnetically attractable beads to precipitate and recover nucleic acids. The 35 U.S.C. 112 first paragraph rejection on lack of enablement is thus rendered moot.

The amendments to the claims meet all of the rejections

under 35 U.S.C. 112 second paragraph on indefiniteness.

Claims 1 to 4, 6 and 8 to 9 have been rejected under 35 U.S.C. 102(b) as being anticipated by Warren. Further, claims 1, 3, 6, 8 and 12 have been rejected under 35 U.S.C. 102(b) as being anticipated by Mitchell.

These rejections are respectfully traversed, particularly in view of the above amendments.

Turning to the cited references:

1. In Warren and Mitchell, magnetic particles are used which adsorb cells or other biological material. In some cases, this adsorption is assisted by activators which result in covalent bonding.

In contrast, the method of the present invention involves the use of magnetic beads which do not adsorb the biopolymer, at least not while the polymer remains in solution. The method involves the separate step of precipitating the polymer out of solution, whereby it becomes non-specifically associated with the beads. That step is nowhere taught or suggested by either of the two references. An advantage of applicants' system is that the polymer is easily re-solubilized and separated from the magnetic beads.

Accordingly, the rejection on Warren or Mitchell is untenable.

2. The remaining references, cited but not applied, have been considered, but are deemed unsuggestive of the present claims.

As is apparent, both Warren and Mitchell were cited in the International Search Report attached to the subject International application publication No. WO 91/12079. During International Preliminary Examination, the Examiner applied these references against applicants' claims. Applicants reply then was the same as that set out in numbered paragraph 1. above. On the basis of that reply, the Written Opinion of this International Preliminary Examining Authority was to the effect that all claims

were novel and inventive over the cited prior art.

Following that Written Opinion, applicants believed that the prior art cited in the International Search Report was not material to their claimed invention, and did not therefore bring it to the U.S. Examiner's attention by way of an Information Disclosure Statement.

Another reference brought forward in the International Search Report was "Biotechnology Letters", Vol. 3, No. 6, pages 297-302, 1981 (P. A. Munro et al.) "Magnetic seeding to aid recovery of biological precipitates". Applicants have recently come to realize that this reference is more nearly relevant to their claimed invention. Therefore, submitted herewith is an Information Disclosure Statement citing it and an associated reference (C. Latour and H. Kolm, "IEEE Transactions on Magnetics", Vol. Mag-11, No. 5, September 1975, pages 1570-1572).

The Munro reference teaches that use of magnetic particles to seed a biological precipitate makes the precipitate amenable to magnetic separation technology. Although the reference is mainly concerned with magnetic particle seeded precipitation of protein, there is an indication that the separation of nucleic acid or protein precipitates during an enzyme isolation process are suitable steps for application of the seeding technique. There is no experimental support for application of the seeding technique to nucleic acid precipitation, and no discussion of what might be done to a nucleic acid precipitate so formed.

Over this reference, applicants' claim 13 is unobviously distinguished characterized by the fact that the final product is a nucleic acid containing liquid, generally in pure form from an impure starting solution or concentrated form from a dilute solution. After the nucleic acids have been precipitated and separated from the supernatant by means of the magnetic beads, the nucleic acids are resuspended in fresh liquid and separated from the beads. None of this is disclosed in the

reference.

Claims 14 to 20 recite additional features which further distinguish applicants' invention over the Munro reference.

The Latour reference briefly describes the use of magnetically susceptible seeding material in the removal of virus and other solids during water purification. There is no teaching to recover the virus precipitate.

The Munro and Latour references are dated 1981 and 1975 respectively. To the best of applicants' knowledge, the publications have not led to any commercial products or techniques. If Munro is seen to show the need for a good separation system, applicants have delivered something much better than was suggested by Munro. Applicants method and reagents use inert non-binding magnetic particles to achieve not only separation but also recovery of nucleic acids.

With regard to the requirement for a new Oath setting forth the city and state of applicants' post office address, such is set forth in the attached Declaration.

With regard to the requirement for corrected drawings, such will be provided upon an indication of allowable subject matter.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, he is invited to contact the undersigned at the telephone number below.

Respectfully submitted,

Michael A. REEVE

By Matthew Jacob
Matthew Jacob
Registration No. 25,154
Attorney for Applicant

MJ/meu
Washington, D.C. 20005
(202) 371-8850
October 20, 1993